

Scientific Exchange Program with CERC and IBIW

Columbia Environmental Research Center and the Institute for Biology of Inland Waters

Introduction

For 27 years, the Columbia Environmental Research Center (CERC), of the U.S. Geological Survey, Biological Resources Division, in Columbia, MO, and the Institute for Biology of Inland Waters (IBIW), Russian Academy of Sciences, Borok, Russia, have maintained a scientific exchange program. The initial impetus was a US-Soviet agreement on environmental protection in 1972, that was reaffirmed by a new US-Russian agreement signed by Vice President Gore and Prime Minister Chernomyrdin on June 23, 1994. Under the auspices of these agreements the CERC and IBIW have developed and maintained a long-standing program of environmental research.

Primary Research Areas

Primary research areas at IBIW include investigations on the ecology of aquatic organisms, development of scientific information for the management of water bodies for multiple use, and evaluation of natural and anthropogenic threats to the resources of the Volga River Basin. The IBIW employs approximately 160 scientists, 80 technicians, and 280 other individuals who work as support staff in various areas. Among the scientific staff at the Institute are microbiologists, zoologists, ichthyologists, toxicologists, limnologists, ecologists, immunologists, botanists, hydrologists, and hydrochemists.

Similar to the IBIW, the CERC has a long history of scientific research in the areas of aquatic ecology and toxicology. The primary research areas of the CERC include investigations in environmental toxicology and chemistry, ecological research, landscape analysis and large river ecology, and information and technology transfer. The CERC has a staff of approximately 120 scientists and technicians, and 25 administrative



Photo Courtesy Living Earth, Inc.

Although separated by 5,160 miles, the Columbia Environmental Research Center in Columbia, Missouri, and the Institute for Biology of Inland Waters in Yaroslavl, Russia, share a common research mission.

and maintenance personnel. Among the scientific staff at the CERC are toxicologists, physiologists, biochemists, ecologists, invertebrate zoologists, microbiologists, environmental chemists, hydrologists, biometricians, and geographic information systems specialists.

Scientific Exchange Program

The CERC-IBIW Scientific Exchange Program comprises Area II *Protection of River Basins, Lakes, and Estuaries* of the Gore/Chernomyrdin agreement. Within Area II, research is conducted under two broad project categories: Project 02.02.13 *Effects of Pollution on Aquatic Organisms and Ecosystems: Development of Water Quality Criteria*, and Project 02.02.15 *Assessment of Complex Anthropogenic Impacts on Ecosystems of Reservoirs and Rivers*.



Entrance to the Darwin Reserve.

Project 02.02.13 Effects of Pollution on Aquatic Organisms and Ecosystems: Development of Water Quality Criteria

The purpose of this project is to conduct cooperative research, exchange and compare data, and other information that will lead to development of water quality criteria applicable to both countries. Scientific approaches are developed that are used to assess and evaluate the health, or well being of aquatic ecosystems, i.e., lakes, streams, rivers, reservoirs, wetlands, or coastal areas. These scientific approaches address a wide range of contaminant problems and, when feasible, are customized to endemic species and specific situations. Examples of studies:

- Development of toxicological methods for assessment of contaminated sediments.
- Investigations of the physiological and morphological effects of contaminants in early developmental stages of fishes.
- Development of behavioral methods for assessing the effects of habitat alteration on aquatic environments.
- Assessment of the effects of acidification and mercury in the Darwin Reserve and Rybinsk Reservoir.



A survey of fish populations in the Rybinsk Reservoir, Yaroslavl, Russia, yields a catch of bream, *Abramis* spp.

Project 02.02.15 Assessment of Complex Anthropogenic Impacts on Ecosystems of Reservoirs and Rivers.

The purpose of this project is to conduct cooperative research, to exchange and compare data, and other information that will lead to recommendations for improvement or restoration of habitat and fisheries in the Volga, Missouri, and Mississippi Rivers. The objective is to develop descriptive models or reports on the existing status of the riverine and reservoir natural resources, and the anthropogenic factors affecting them. This information is used to identify the effectiveness of current restoration methods and help develop strategies for needed research. Examples of studies conducted under this project include:

- Development of semipermeable membrane devices for measuring metals and organic contaminant concentrations in the Volga, Missouri, and Mississippi Rivers.
- Assessment of the structure and function of zooperiphyton and benthic macroinvertebrate communities in large rivers.
- Evaluation and management of aquatic macrophyte productivity of Volga, Missouri, and Mississippi Rivers.
- Development of immunoassay and biochemical methods for evaluating

contaminant effects in the Volga and Missouri Rivers.

- Evaluation and management of fishery productivity of the Volga, Missouri, and Mississippi Rivers.

Institute for Biology of Inland Waters

The I.D. Papanin Institute for Biology of Inland Waters is situated on the shores of the Rybinsk Reservoir, in Borok, Nekouz Region, Yaroslavl Oblast. The IBIW has a long history of environmental research in the Volga River Basin. Founded in 1938 as the Upper Volga Station of the former USSR Academy of Sciences, the station was built on property donated by the esteemed academician N. A. Morozov. Then in 1947 the station was reorganized into the Borok Biological Station. Early studies at the station concentrated on the biology of large reservoirs, and the success of these early investigations prompted the reorganization of the station in 1956 into the Institute for the Biology of Reservoirs. In 1962, the expansion of activities and experimental research at the Institute led to its transformation into the Institute for Biology of Inland Waters. In 1987, the Institute was renamed after its founder and first director, the eminent polar investigator, Rear Admiral I.D. Papanin.

The Institute occupies an area of 140 hectares, with seven laboratory buildings, and a library that contains over 200,000 books and periodicals on hydrobiology and related sciences in Russian and other

languages. Several valuable biological collections are also located at the Institute, including collections of algal cultures, an herbarium of aquatic and riparian plants, and extensive collections of fish and aquatic invertebrate species of the Volga region. Additionally, the Institute has 60 research ponds, as well as extensive laboratory facilities for rearing and testing a variety of aquatic organisms. For large river and reservoir research, the IBIW has a fleet of five research vessels for expeditions, and special land vehicles for terrestrial projects.

Information

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A lock and dam on the Volga River near Uglich, Yaroslavl, Russia. Navigation structures on large rivers in the U.S. and Russia modify riverine ecosystems and present challenges to aquatic resource managers.